

FISH PRO, INC.

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TO: MR. JOE CUMMINS

REGION 10 LABORATORY

P.O. BOX 549

MANCHESTER WA 98353

RECEIVED
DEC 21 1988

Water Permits & Compliance Branch
Permits Section

12/19/88
GROVER -
For your information.
Note that I have also routed a copy to Jean Pascal. Jol

GENTLEMEN:

- WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:
- ☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
- ☒ Copy of letter ☐ Change order ☐ Report ☐ _____

COPIES	DATE	NO.	DESCRIPTION
			DRAFT BIOLOGICAL ASSESSMENT PLAN

THESE ARE TRANSMITTED as checked below:

- ☐ For approval ☐ For your use ☐ As requested ☒ For review and comment
- ☐ _____
- ☐ FOR BIDS DUE _____ 19____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS: Joe, You may have already recieved a copy of this as I may have left instructions to have this letter sent to you during my absence in the field. The information presented in the letter and assessment outline ^{is} not finalized and ~~is~~ is open to discussion and comment. Please comment if you are inclined to do so as I respect and value your input.

Thanks!

COPY TO: _____

SIGNED: Wayne S. Wright

FISH PRO, INC.

3780 S.E. State Highway 160, Port Orchard, WA 98366

(206) 871-2727

December 7, 1988

United Marine International, Inc.

Attn: Ms. Ruth Nelson

1441 Northlake Way

Seattle, WA 98103

Re: Biological Effects Determination of Lake Union Sediments
Surrounding the UNIMAR Shipyard.

Ms. Nelson:

To date we have contacted appropriate environmental regulatory and monitoring agencies to gather information regarding the Lake Union environment and recommended approaches to biological assessment of UNIMAR sediments. We are still acquiring written documents; however, the following points summarize our investigation to date:

1. The City of Seattle and Metro are continuously studying the Lake Union ecosystem and much of this information is unpublished. Currently, numerous storm drains and other point source outfalls are being studied. Sediment chemistry and bioassay analyses are part of this effort. Results are unknown at this time.

2. The benthic community status of Lake Union is generally unknown. Researchers have reported areas devoid of these organisms and other studies have identified certain areas that support at least limited benthic communities. To date, it appears that the past investigations have not followed similar sampling methods which may have led to this discrepancy.

3. Lake Union experiences shifts in dissolved oxygen and to

a limited degree, salinity. During summer months, water near the bottom of Lake Union is commonly devoid of oxygen (Wayne Wagner, U.S. Army Corps of Engineers, personal communication). The saltwater wedge has been monitored for several years but only on a general basis. Salinities between monitoring stations are interpolated and are not considered absolute values (Wayne Wagner, personal communication).

Bioassays of Lake Union sediments have been performed by EPA and Ecology at two locations; Gas Works Park and the former Marine Power and Equipment (MPE) Yard one dry dock facility. Additional bioassay work may have been undertaken by the agencies and results are unpublished.

4. Investigations conducted at Gas Works Park by Ecology have utilized the triad approach (analysis of benthic community, sediment chemical composition, and bioassays) which appears to be the most applicable methodology for the UNIMAR investigation. This method is also the standardized technique used in the Puget Sound Dredge Disposal Analysis. Additional site specific data generated by this effort is required to help fully describe the environmental conditions at the UNIMAR site.

The EPA made two attempts to characterize the sediments at the former MPE site by performing two series of bioassays. The first bioassays were performed in 1985 and compared the toxicities of two used and unused sandblast grit materials at the MPE site. Definitive toxicity was illustrated in both materials as indicated by total mortality in amphipod bioassay. Control bioassays in 1985 remained above 90% survival.

Methodology for the above and subsequent bioassays performed by EPA staff using sediments collected from the MPE site in 1987 were discussed with Mr. Joe Cummins of the EPA Manchester Lab.

The 1987 results were reported in a draft manuscript which was never finalized with interpretive discussion of the results. Results of the 1987 bioassays using sediments collected around the MPE drydocks were not conclusive. As shown in Table 1 of the 3/3/87 EPA draft report, control survival was 78% and only one sediment sample had a lower survival at 62% in the freshwater amphipod, Hyalella azteca, bioassay. Bioassay performed with Daphnia pulex in 1987 showed a more marked reduction in percent survival but still not characteristic of seriously toxic sediments. All of these bioassays were conducted as static, solid-phase tests with five replicates. Ten amphipods and five daphnids were used in the respective test chambers.

Several aspects of the 1987 work were discussed with Mr. Cummins as to the interpretation of these results.

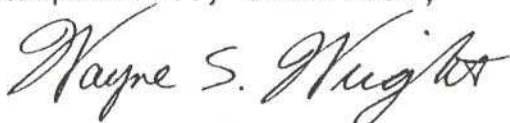
- A. The collection depth of the sediment was unknown and not reported with any analytical results.
- B. It would have been desirable to have maintained an amphipod control survival of 90% or better. The toxicity to the amphipod, Hyalella azteca, appears to be minimal and unquantifiable based on the 1987 results.
- C. Some of the reported daphnid mortality could have resulted from abrasion due to aeration of the test chambers. Mr. Cummins could not definitively quantify this loss but suspected a significant part of the observed mortality could have resulted from abrasion as free swimming Daphnia pulex were rolled and disturbed by air bubbles.

In light of the above concerns and the lack of interpretation

and initial follow-up investigation at the time of these bioassays, toxicity of MPE sediments was not fully demonstrated. Definitive conclusions as to the sediment toxicity at MPE cannot be made with the data generated to date.

5. Based on these data, and the information gathered from other sources, the attached proposed biological assessment outline was developed. To provide uniformity in scientific methods, the triad approach is recommended incorporating similar bioassay conditions as described in the EPA 1987 and Gas Works Park studies. Bioassay protocols for the freshwater amphipod have recently been prepared by the American Society for Testing and Materials (ASTM) and are recommended for use in this project.

Respectfully Submitted,



Wayne S. Wright, Biologist

c.c. Mr. James K. Farr
Mr. Richard Koch
Mr. David W. Jamison
Ms. Ruth A. Nelson
Mr. James M. Thornton
Mr. John Malek - 2 copies
Mr. Scott Widness

WSW/rmg

DRAFT

A PROPOSED BIOLOGICAL ASSESSMENT APPROACH TO DETERMINE TOXICITY OF SEDIMENTS ASSOCIATED WITH THE UNIMAR INTERNATIONAL, INC. SHIPYARD IN LAKE UNION

I. BENTHIC COMMUNITY DETERMINATION

A. Sampling Stations

1. The same seven sampling stations identified for sediment chemical analyses will be employed.
2. Sample interval 0-10cm.

B. Identify all benthic organisms to genus level

1. Enumerate organisms
2. Note any reproductive conditions (gravid females, juveniles, etc.)

C. Comparative Analysis

1. ANOVA (Analysis of Variance), between stations and control
2. Use Gas Works Park 1986 Chester Morse Lake Control information or collect another control sample from Lake Washington (e.g. Arboretum Park)

II. BIOASSAY - FRESHWATER AMPHIPOD, Hyalella azteca

- #### A. Follow 1988 proposed ASTM method protocol in all lab procedures.

B. Sampling/Test Design

1. Composite sampling: Combine stations 1 and 2, 3 and 4, 5 and 6. ⁹ Samples 7⁸ is offsite and not a composite (location to be determined). See Geo-Engineers Work Plan. A total of four samples will be tested.

Lake Wash?

DRAFT

2. Controls: Three controls with five replicates for 15 test chambers
 - a) Repeat EPA 1987 West beach substrate
 - b) Test unused sandblast grit to compare to 1985 test results
 - c) Cadmium reference test
3. Field sampling at above stations to collect sediment from ^{one} ~~two~~ layers within the cores:
 - a) 0-2 cm b) ~~8-10 cm~~Sufficient sample must be collected to provide for at least five replicates per station. Five laboratory replicates are necessary to achieve an acceptable level of statistical sensitivity. Sediment bioassays will be conducted for both sample depths at each composite station for a total of 40 test bioassay chambers.
4. Ten amphipods per test chamber. A total of 55 test chambers and 550 amphipods will be required.

C. Analysis and Reporting

1. ANOVA and other applicable statistical procedures as required based on initial data analysis.
2. Tabular presentation of results with written results summation and interpretation.